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with C. Puzos's
kind regards.

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A SURGICAL REVIVAL. *The Inaugural Address delivered on October 4th, 1894, on the opening of the Fifty-sixth Session of the Liverpool Medical Institution. By the President, CHAUNCY PUZEY, F.R.C.S., Surgeon to the Northern Hospital, Liverpool.*

GENTLEMEN,—My predecessors in this office have delivered addresses of such a high standard that I have found it a difficult matter to follow them in a manner that appeared worthy of the occasion. The only advantage they have left me is that of being able to speak on a subject in which I am personally interested. For my immediate predecessor naturally chose a medical subject in which he had taken the greatest interest, *i.e.* affections of the nervous system; whilst his predecessor, Mr Banks, in both of his addresses, showed his many-sidedness by avoiding surgery, and speaking on such subjects as “Medical Education,” and “The Advantage of Medical Men keeping up their General Reading.”

At the opening of a session which will, I suppose, as usual, be devoted to the consideration of the most recent advances in the practice of the various branches of our profession, dealing very much with the matters of to-day, it appeared to me that it would be well to look back a little, and recall some of the events of interest and of advance which have taken place within my experience, or, at all events, within the experience of

some of our older members. Surely it must be not only interesting, but profitable also, to look back and consider the difficulties with which our predecessors had to contend, to see how they overcame them, and to recognise, with thankfulness, the great advances made in recent years, and the wonderful advantages we have gained thereby.

Considering what subject I should select for my introductory address, I thought of the various improvements in the details of surgical practice which have taken place since I came to Liverpool, and the question occurred to me—What improvement has held its ground longest, and still appears likely to do so, in much the same form as when introduced to notice?—and I believe I may safely say that the *aseptic animal ligature* holds the first place. This appeared at first a slight thread upon which to hang an address; but, when I remembered that this year just a quarter of a century has elapsed since this most valuable adjunct to surgery was introduced by Professor Lister, and that it was first used on the human subject, and that successfully, in the old Royal Infirmary of this city, by Mr Bickersteth, at the time when I was the house-surgeon, I thought it might be interesting to you to take a short survey not of the last twenty-five years, but of the few years preceding 1869, during which period an active controversy was carried on regarding the best method of controlling arterial hæmorrhage;—acupressure *v.* the old-fashioned ligature; torsion *v.* acupressure; and finally, the catgut ligature *v.* torsion.

To the older members of the Institution much of that which I shall say will be merely an old story retold, but to very many of you I believe that this retrospect will really contain something of novelty, because, at the rate at which professional studies multiply, there is not much time for looking backwards, even for twenty-five years. In our profession the observation must often be true that “What is new is not true,”¹ and I think my paper will tend to show that instead of looking out for so-called new treatments, often the better way is to try and

¹ The original version of this quotation is “What is valuable is not new, and what is new is not valuable.”

improve the old and well-tried methods ; and so, by patient and watchful attention, to bring them as far as possible to perfection.

In December 1859 the late Professor Simpson read a paper before the Edinburgh Medical Society, giving the results of certain experiments which he had made on animals, showing that even the largest arteries might be effectually occluded by compressing them by means of needles, which could be safely removed after one, two, or three days ; at the end of which time the vessels were found securely plugged. He believed that surgeons would find in this method a means of obtaining primary union which was prevented by the seton-like action of the silk or hempen ligature. On the 4th of April 1860, at a meeting of the Medico-Chirurgical Society of Edinburgh, Dr Alexander Simpson showed a cast of (as he believed) the first stump in which acupressure had been applied in England after amputation. The case was one of amputation of the thigh by Teale's method, and the operator was Mr Crompton, then senior surgeon to the Birmingham General Hospital. Only two needles were used,—one to press on the femoral artery, passed through the short flap ; the other passed through the long flap, and compressing two muscular branches. The needles were removed on the third day, and the patient did extremely well. The cast was accompanied by two letters from Mr Crompton to Professor Simpson, in the first of which he relates this and another case in which he had tried acupressure. The second letter records the successful result of both cases, and ends as follows :—"I have no doubt you will hear of the needle being generally adopted, and I can only say I am so pleased with the facility of its use that, with the *usual* professional feeling, I wished I could have speared *your* thigh, in spite, that you, a 'no surgeon,' should have hit us purblind surgeons so hard on our own ground."

This operation was performed on the 29th of February 1860, but was not the first case in which Simpson's needles were used, for on February 16th Mr William Adams of the London Hospital had used them in a case of Pirogoff's amputation ; but I find that two days earlier than that, on the 14th of February,

Mr Bickersteth tried acupressure at the Royal Infirmary in a case of amputation of the leg. Three needles were used, and were removed at the end of forty-eight hours. No bleeding occurred. In a letter to the editor of the *Medical Times*, dated February 20th, 1860, Mr Arthur Wiglesworth claimed this as the first case, but it was apparently the second case in which it was used in England, Professor Simpson himself having used it on January 31st in a case of amputation of the leg at the Carlisle Infirmary, by the invitation of the operator, the late Mr Page. But in that month Dr Greig of Dundee had already used it in three cases of amputation. He had been urged to it by Professor Simpson. He tried it with much doubt, but speedily became a convert.

I have already alluded to Mr Crompton's good-natured expression of humiliation because one who was "no surgeon" had hit upon this idea; but one of Professor Simpson's colleagues was not so generous. Professor Syme bitterly resented the fact that one "who had no notion of surgery," as he expressed it, should have trespassed on his preserves. In London, at a meeting of the Medico-Chirurgical Society, in April 1860, he condemned the innovation in the most sarcastic terms, and continued to exercise his influence against it for years. Five years later, there appeared in the *Lancet* of April 1st, 1865, the abstract of a clinical lecture, in which he treated of the subjects of "acupressure, torsion, and the ligature," which shows his undiminished hostility.

Towards the conclusion of this lecture he said:—"When, therefore, extraordinary efforts are used to shake your confidence in the ligature, and induce you to adopt other means for the suppression of hæmorrhage, I consider it my duty to warn you against being misled by these representations, just as I have on various occasions opposed innovations which seemed calculated to impair the practice of surgery." After alluding to some of these innovations, he said:—"When it was proposed to suppress hæmorrhage by means of needles instead of ligatures, I expressed disapproval, on the ground that such a procedure was uncalled-for, inexpedient, and in most cases impracticable; so

that, when contrasted with the facility, safety, and efficiency of the ligature, it reminded one of the powders for killing fleas, which required that each of them should be seized by the nape of his neck, so as to make him gape and admit a mouthful of the poison."

No doubt his opposition had its effect; and although this method of treatment was practised in various countries for some years after Professor Simpson's introduction of it, it did not meet with anything like general adoption.

But in the summer of the year 1865 the late Dr Pirrie, Professor of Surgery at Aberdeen, once more brought this treatment very prominently before the profession. He and Dr Keith published a considerable number of cases in which they had used it with success, and Dr Pirrie's communication on the subject, published in the *Medical Times* of July 1865, concludes thus:—"I have always felt and taught that the application of the ligature by Ambrose Paré, to arrest hæmorrhage in amputations and other wounds, is the greatest single improvement in the history of surgery; that it was the greatest of the many benefits that truly great and good man was the instrument of conferring on his fellow-men, and that he might well say, 'For the good of mankind, and for the improvement and honour of surgery, I was inspired by God with that good thought.' Ambrose Paré earnestly implored surgeons to 'bid eternally adieu to hot irons and cauteries used in arresting hæmorrhage' in amputations and other wounds,—advice which the operators of those dark and cruel times of surgery were careful not to follow, but persecuted him exceedingly on account of his beautiful and simple proposal of using nothing but deligation in amputation wounds. In these later and milder times of surgery we cannot bid adieu to the ligature, because there are some conditions in which acupressure cannot be used, as there are others in which it is impossible to employ the ligature; but while many great operations have such a high rate of mortality, in the practice of *all* good surgeons, in *all* countries, it seems to be our duty not 'to rest and be thankful,' but to receive and gratefully to adopt acupressure, in the hope that

some of the sources of danger may be modified, or entirely removed."

Probably this eloquent appeal had a considerable effect in causing an extended and more general trial of acupressure. The cases published by Dr Pirrie and Dr Keith are sufficiently striking to cause one almost to wonder why it has been altogether dropped. One of the most remarkable I will quote in Dr Keith's own words:—"In the fifth case, amputation of the thigh in a boy aged twelve, an occurrence happened not at all desirable, but still instructive. The restless boy, amusing himself with the pin-heads protruding at the angle of the wound, had, before four hours had elapsed, withdrawn three of them, yet no hæmorrhage took place. I applied no substitute, and yet all did well. It would therefore appear that four hours' pressure would suffice to perfect coagulation sufficient to shut any artery; for the *femoral* was one of those relieved of its supporting pin."

My first experience of it was in the year 1867, when it was tried by Mr Hakes in a number of cases; amongst which I find, on referring to the old operation-book, three cases of amputation of the thigh, one of the lower third of the leg, one of Syme's amputation. I only remember one case in which it failed, that of an old man with atheromatous vessels. Amputation of the lower half of the forearm had been performed for epithelioma of the back of the hand. The vessels were secured by needles, but an hour or two after, when reaction took place, such free bleeding occurred that I had to reopen the stump and tie the vessels.

At my old hospital, Guy's, I find that the papers of Pirrie and Keith so interested the late Mr Cooper Forster, that he went up to Aberdeen and stayed there four days, for the purpose of learning their methods; and in the *Guy's Hospital Reports* for 1868 there is an interesting article on the subject by Mr Forster, at the conclusion of which he states that he never intends again to use a ligature. The next volume of reports, however, contains an article by the same surgeon, "Acupressure and Torsion," in the course of which he says that "the whole subject cannot be approached with any idea of coming to a

conclusion until far more experience than even my opportunities have afforded me is recorded by unprejudiced observers." The fact was that he had met with some cases in which, after removal of the needles, secondary hæmorrhage occurred, and examination had shown that the whole success of the treatment often depended upon the stability of the conical-shaped clot which formed above the narrowed part of the artery; for, although it was maintained by some that complete agglutination of the serous lining of the artery soon occurred at the compressed point, that certainly was not the result in some instances. Then, in the *Guy's Hospital Reports* for the following year appears a paper by Mr Bryant on torsion, which had then become the favourite practice at that hospital. By this time the catgut ligature had been introduced by Professor Lister, and acupuncture soon passed into oblivion.

The history of acupuncture is a remarkable instance of the manner in which a new method of treatment may appear at first likely to effect a complete change in practice, may be taken up with the greatest enthusiasm for a time, and then be dropped, and become but a memory of the past. I have felt interested in searching into the reasons why this treatment had such a short and chequered existence.

In the first place, although in some cases the needles were easily applied, in others it was not an easy matter, and, until the surgeon had had considerable practice, much time was spent in applying them. Then, if many needles were used, the ends stuck out in such a manner as to make it difficult to accurately close the wound; and although, theoretically, these wounds should have healed without suppuration, they frequently did not do so; moreover, although in a healthy subject the vessels were soon closed, it was frequently only by a plug of clot; and if that clot softened, there was nothing to prevent hæmorrhage.

Well, when a man is struck with a new method of treatment he does not mind spending some extra time and trouble over it, but later on, especially if he has had a disappointing result in one typical case, he begins to wonder whether this extra trouble is worth taking, and probably gives it up. No doubt

failures did arise, although they were not published. It was already being dropped in favour of torsion when the catgut ligature came into view, and seems to have come to stay.

Torsion, of course, is one of the oldest methods of treatment. Roughly applied, it is nature's own method of preventing hæmorrhage. An artery stretched to breaking-point, or twisted until its elasticity is destroyed, is secured against bleeding. I find in *Chelius' Surgery* that Velpeau was the first to use it designedly on the human subject, although Amussat tried it on the lower animals; but in this country, at all events, the method attracted little notice until it was recommended by Professor Syme in 1868. Professor Humphry of Cambridge and Mr Bryant of Guy's Hospital interested themselves very much in investigations thereupon; and in *Guy's Hospital Reports* for 1870 there is an interesting paper on the subject by Mr Bryant, illustrated by coloured plates, of which I now show enlarged copies.

I remember, that year, having a conversation with Mr Howse and some others of the staff at Guy's on the comparative merits of torsion *v.* carbolic catgut ligature. The Guy's men would hear of nothing but torsion at that time, and for some years it was the favourite practice there. Every Guy's dresser learnt to practise it and to swear by it, but the catgut ligature prevailed in the end, not because torsion had failed, but because the catgut ligature was found to be as secure, and was much more readily applied.¹

Amongst other workers on this subject, I am glad to have the opportunity of mentioning the fact that Dr Rawdon took up the question of a soluble wire ligature. He experimented with magnesium wire, as to its oxidation and absorption by animal tissues. He even carried about, under the skin of his arm, pieces of this wire; and so satisfied himself and others on the point that on April 14th, 1868, Mr Bickersteth used it for securing the spermatic artery with success in a case of castra-

¹ The *Lancet* for 1874, Vol. I., contains a letter from Mr Bryant, mentioning 200 consecutive cases of torsion of the large arteries in amputations, without any secondary hæmorrhage.

tion ; but the supply of wire was limited ;—it was very expensive, and was not often used. Then came a memorable day, the 3rd of April 1869, when Professor Lister's "Observations on Ligature of Arteries on the Antiseptic System" appeared in the *Lancet*, announcing his discovery of "an antiseptic animal ligature which, applied to an artery, virtually surrounded it with a ring of living tissue, which actually strengthened the vessel where it obstructed it."

Up to that date the ligature had been tried only on the calf, but it so happened that in one of Mr Bickersteth's wards there was a man with aneurysm of the common femoral artery, waiting for operation ; and further, on that very day, Mr Bickersteth sent in a man suffering acutely from carotid aneurysm. Mr Bickersteth's attention was drawn to this article, and he at once decided to try the new ligature. Mr Banks, who at that time was assisting him, lost no time in procuring some catgut, and prepared it in Lister's method just in time for use on the following Tuesday, so that on the 6th of April, three days after the publication of that paper, Mr Bickersteth had the honour of putting the capping-stone to Professor Lister's experiments, and had the satisfaction of recording, a few weeks later, that both patients had left the Infirmary well. [These cases will be found fully reported by Mr Bickersteth in the *Lancet*, 1869, vol. i.]

I have entitled this address "A Surgical Revival," because the Listerian ligature is the outcome of the revival of an idea so old that it is well-nigh impossible to say when it was new.

[At this point I will make a slight digression, and observe that a careful search into the history of so-called new methods often leads to rather surprising discoveries, and forcibly reminds one of the saying of Ecclesiastes the Preacher, "There is no new thing under the sun. Is there anything whereof it may be said, See, this is new ? it hath been already of old time, which was before us. There is no remembrance of former things."¹ The history of the "animal ligature" is very suggestive of this thought ; and a still more remarkable illustration of the an-

¹ Ecclesiastes i. 9-11.

tiquity of supposed modern inventions was to be seen at the annual museum of the Meeting of our Association at Bristol this year. There were cabinets full of surgical instruments, some of the most delicate make and shape, and still in good preservation, which had been disinterred from the ruins of Pompeii. Many of these instruments resembled almost exactly those which we use at the present time, and might have served as models for our present instrument-makers. And more than this, they compared most favourably with some of the instruments made only a hundred and fifty or two hundred years ago, which were probably then thought to be new.]

In the old classical works of surgery, such as South's translation of *Chelius*, and Cooper's *Surgical Dictionary*, reference is made to the use of silkworm ligatures, suggested by Dr McSweeney of Cork, who experimented with it on the lower animals; and in 1826 it was used successfully by Mr Fielding of Hull in operations on the human body. In the year 1818 Sir Astley Cooper used a catgut ligature, softened by soaking in water, for tying the femoral artery in a case of popliteal aneurysm. The ends of the ligature were cut short, and the patient was up and walking about at the end of three weeks. In succeeding cases he was not so fortunate, and soon gave up the practice.

Sir Astley Cooper himself said :—"It would be an extremely desirable thing if any person invented a ligature composed of materials which would admit of solution; he would by such an invention greatly serve his profession. I thought that a ligature made of catgut would admit of solution, and I tried it on a man eighty years of age, on whom I performed the operation for popliteal aneurysm. The experiment succeeded, it is true, in this case, but I have used it in three other cases since, and did not find it at all superior to the common ligature: in each of the three cases it came away by suppuration and ulceration, as in common cases: it did not, therefore, succeed. On the whole, catgut ligatures are not at all superior to the common ones. Some animal matter of the form of gluten, made into ligature, might do; but this is mere conjecture. At present there is no ligature known

which is capable of being dissolved, and removed by the absorbents.”¹

Ligatures made of buckskin had been used even earlier than this, the ends being cut short, but the knots had to find their way out through a sinus; and going back still further, we find that *Galen recommended silk or catgut for ligatures*. But the difficulty to overcome was, that the knot had to be reckoned with. The thought and the experiments of Professor Lister solved the difficulty, and the question which had been for ages puzzling the minds of the ablest surgeons throughout the world was answered by the production of a ligature capable of being absorbed by, or incorporated with, the tissues in which it was buried.

Thus, after various attempts to find out some better plan, surgeons once more came back to the ligature after the method of Ambrose Paré, but perfected by Lister, and after twenty-five years of trial the principle stands good. There have been improvements in its manufacture, and other materials have been substituted, but the antiseptic animal ligature is Professor Lister's, and is, I think, the most important surgical invention of our time. For, not only have we to consider its use as a ligature, but as a buried suture. Those who have commenced surgical work during the last twenty years have no idea of the extent of our gain in this respect. They may partly imagine, but can never wholly realise, the want of such an aid as a suture which can be used for bringing together the deep structures in a wound and closing the wound over them. Just to give an instance of its use in the oldest of operations, say amputation of the thigh in the case of a child or delicate young adult for disease, where the periosteum, with the muscles attached, tends to strip off the bone like a glove off a finger,—what trouble often arose in keeping the end of bone covered! Now we can rectify this by stitching the periosteum, or, as I have found more convenient, by running a suitable piece of catgut in and out round the soft parts attached to the periosteum and drawing them together over the bone, in the same way as a

¹ *Lectures on the Principles and Practice of Surgery*, by Sir A. Cooper, 6th edition, 1839.

string is tied round the neck of a bag. And all here must admit that a large number of the modern, more especially the intra-abdominal, operations could never have succeeded without these aseptic animal sutures.

Gentlemen,—I hope you will consider that the fact that this is its twenty-fifth anniversary, and that it was first tested on the human subject in this city, by one of our past presidents, is a justification for my occupying your time this evening with a retrospect which to myself has been an interesting holiday task, and will, I hope, have been not without interest to those whom I have had the honour to address.